



Ground-Water Resources of the Clifton Park Area, Saratoga County, New York

ABSTRACT
Ground water is the sole source of public water supply for Clifton Park, a growing suburban community north of Albany, New York. Increasing water demand, coupled with concerns over ground-water quantity and quality, led the Clifton Park Water Authority in 1995 to initiate a cooperative study with the U.S. Geological Survey to update and refine the understanding of ground-water resources in the area.

Ground-water resources are largely associated with three aquifers in the eastern half of the area. These aquifers overlie or encompass the Colonie Channel, a north-south-oriented bedrock channel that is filled primarily with lacustrine glacial deposits. The three aquifers are: (1) an unconfined lacustrine sand aquifer, (2) the Colonie Channel aquifer, which is confined within the deepest parts of the channel and variably confined and unconfined within the shallower, peripheral channel areas, and (3) an unconfined alluvial aquifer beneath the Mohawk River flood plain, which represents the southern limit of the study area. The lacustrine sand aquifer has little potential for large-scale withdrawals because it is predominantly fine grained and is susceptible to contamination from human activities at land surface. Water from this aquifer can, however, recharge the underlying peripheral parts of the Colonie Channel aquifer where hydraulic connections are present. The Colonie Channel aquifer consists of thin sand and gravel and (or) shallow, fractured bedrock over much of the channel area; discontinuous deposits of thicker (more than 20 feet) sand and gravel are common in the peripheral channel areas. The deepest, or central, channel area of this aquifer is isolated from the overlying lacustrine sand aquifer by a continuous lacustrine silt and clay unit, which is the primary channel-fill deposit. The most productive areas of the Colonie Channel aquifer are typically the shallow peripheral areas, where conditions range from unconfined to confined. The most productive aquifer within the area is the alluvial aquifer, which is sustained to an unknown extent by induced infiltration of Mohawk River water.

The chemical composition of ground water within the Clifton Park area varies widely in response to hydrogeologic setting, pumpage, and contamination from human activities. These chemical differences can be used to deduce ground-water flow paths within and between the unconfined and confined areas of the aquifer system. Six water types are defined; three are naturally occurring and three are the result of human activities.

Precipitation that infiltrates the land surface is the sole source of recharge to the lacustrine sand aquifer; precipitation also recharges the alluvial aquifer and unconfined parts of the Colonie Channel aquifer. Ground-water withdrawals from confined or unconfined peripheral areas of the Colonie Channel aquifer induce flow from recharge areas, from the underlying bedrock, or from other confined aquifer areas.

The rate of recharge to the confined central area of the Colonie Channel aquifer appears to be low. Potentiometric levels as much as 100 feet below water-table levels in the overlying lacustrine sand aquifer indicate two large depressions in the potentiometric surface; these depressions indicate that withdrawals from this aquifer have cumulatively exceeded the recharge rates. Localized recharge of the central channel area apparently occurs from two peripheral channel areas that are characterized by zones of elevated water levels and (or) by water chemistry that differs from those within the central channel area. Recharge from, or hydraulic connection with, adjoining segments of the Colonie Channel aquifer to the north and south is likely, but the potential for significant recharge is low because the aquifer is thin and poorly permeable.

